Online Supplement:

1. Other relevant review papers:

In Table 1, we present a comprehensive list of relevant review papers. The scope of each article is given in the "Subject area" column taking into account a specific area (e.g., casualty management or relief management) for all types of disasters or exclusively for natural disasters. Some of the surveys present avenues for future research and/or methodological concerns at the tactical or strategic levels. In contrast, other studies focus on specific methodological trends and gaps at the operational level. The "Main OR category" column outlines whether the paper provides an overview of relief operations or focuses on a particular problem area.

1.1. Review papers with a systematic review framework

A classic example of a systematic approach can be found in Galindo and Batta (2013) where they first classified papers based on multiple common features using the classification scheme proposed by Altay and Green III (2006) and then employed the classification method proposed by Denizel et al. (2003). The most substantial contribution of their work is an evaluation of the most common assumptions made within the OR literature in DOM and an analysis of the extent to which the existing studies covered the gaps identified previously by Altay and Green III (2006). Anaya-Arenas et al. (2014) followed a systematic selection process to identify 83 relevant articles on relief distribution networks that they classified based on three OR features - the type of data modelling, the scope of the problem, and the problem-solving approach. Leiras et al. (2014) developed a classification framework to review 228 papers through a two-step content analysis. They classified the literature based on ten criteria including the optimization approach, the type and phase of the disaster, the research method, the decision-making level, the coordination level, and stakeholder perspectives. Their review used both qualitative and quantitative content analysis methods previously developed by Seuring et al. (2005). Behl and Dutta (2019) reviewed 362 papers published between 2011 and 2017 in the humanitarian supply chain area. They used the content analysis framework proposed by Mayring (2003) consisting of four steps: material collection, category selection, evaluation of literature, and descriptive analysis. Their study focused on major themes, including humanitarian logistics, research-based theories, case studies, mathematical models, humanitarian supply chain features, information technology, and different types of resources. Kovacs and Moshtari (2019) provided a well-designed methodological roadmap highlighting several critical elements in DOM research. They reviewed a total of 43 papers from 2006 to 2018 emphasizing essential modelling aspects, including problem structure, uncertainty components, and enabling technologies used in model development and implementation. To help increase the quality of the research conducted in the field, they suggested a meta-process for research on humanitarian operations somewhat similar to what we developed in this paper.

1.2. Review papers with a general framework

In the following, we review the studies with a general framework that typically focuses on different aspects of a DOM problem or a specific problem type, subject, or relief operation. In this class of review papers, no systematic review framework is provided.

– Overview of multiple relief operations. Some review papers classify articles based on specific features, including the type of relief operations (Caunhye et al., 2012; De la Torre et al., 2012; Zheng et al., 2015; Boonmee et al., 2017), the disaster management stage (Ortun˜o et al., 2013; Ozdamar and Ertem, 2015), the type of uncertainty modelling (Hoyos et al., 2015; Liberatore et al., 2013), and other aspects of the relief operations (Overstreet et al., 2011). Using content analysis techniques, Caunhye et al.(2012) classified the literature according to whether the operational stage occurred before or after the disaster's impact. The authors focused on applications of optimization models to short-term pre-disaster relief logistics operations (e.g., facility location, stock pre-positioning, and evacuation) and post-disaster relief logistics operations (e.g., relief distribution and casualty transportation).

They also discussed the crucial relief operations and activities still missing in the DOM literature. Ozdamar and Ertem (2015) classified the literature according to various problems and modelling approaches and analysed multiple problems associated with the response phase (e.g., casualty and relief transportation, mass casualty evacuation, and vehicle routing) and the recovery phase (e.g., debris management and infrastructure restoration).

– Reviews specific to a single operation within DOM. Other review papers focus on a specific operation related to DOM such as inventory management (Balcik et al., 2016), evacuation management (Bayram, 2016), or vehicle routing and facility location models (Amideo et al., 2019). Balcik et al. (2016) reviewed 43 studies that focused on inventory management for the preparedness and response phases of DOM. They evaluated the existing literature based on seven dimensions – stakeholders involved, disaster type, demand characteristics, decisions taken/length of the planning horizon, variety of the facilities involved, choice of performance measures, and methodological aspects (i.e., solution type, type of model, and solution approach). Bayram (2016) reviewed 191 papers on large-scale emergency evacuation models and their optimization-based solution methodologies considering different human behaviour and transportation strategies. He classified the literature based on the type of mathematical model, traffic assignment, evacuation, evacuee behaviour, and shelter location, among others. Amideo et al. (2019) identified the challenges of utilizing optimization models in DOM for facility location and evacuation routing problems under four modelling phases (conceptual modelling, optimization methodologies, experimentation, and implementation). In addition, they analysed nine case studies according to six categories, including stakeholder involvement, evacuation modes, modelling inputs and parameters, evacuee and system behaviour, and optimization methodologies.

To the best of our knowledge, there is only one survey (Sabbaghtorkan et al., 2020) that focuses on natural disaster logistics in DOM using OR methodologies. Their work centres on the prepositioning of assets and supplies in the preparedness phase of DOM. In contrast, our study concentrates entirely on the response phase of DOM. Thus, when compared to the existing review papers discussed above, we believe that the first contribution of our work is the analysis of optimization models focused on the response phase of DOM and their classification according to the natural disaster type under study. Secondly, we analyze the most recent optimization methodologies. Thirdly, we analyze questions and assumptions identified by three main literature surveys as open questions for each type of natural disaster and identify the current challenges. Finally, we highlight further research directions, linking our findings with those arising from previous surveys.

Table 1: Characterization of the review papers in DOM published in Q1 and Q2 journals (SJR,2019) between 2010 and 2020.

Reference	Subject area	Review level	Main OR category	Operations stage: Mitigation	Preparedness	Response	Recovery	Period	Journal*	# Papers
Overstreet et al. (2011)	Humanitarian logistics	Strategic, tactical	General models	✓	✓	✓	✓	1995-2009	JHLSCM	51
Caunhye et al. (2012)	Emergency logistics	Operational	General models	✓	✓	✓	✓	1970-2012	SEPS	N/A
De la Torre et al. (2012)	Disaster management	Operational	Vehicle routing models	✓	✓	✓	✓	1987-2011	SEPS	29
Galindo and Batta (2013)	Disaster management	Strategic, tactical	General models	✓	✓	✓	✓	2005-2010	EJOR	155
Liberatore et al. (2013)	Humanitarian logistics	Strategic, tactical	Uncertainty models	✓	✓	✓	✓	2005-2012	Book chapter	N/A
Ortuño et al. (2013)	Humanitarian logistics	Strategic, tactical	Decision support models	✓	✓	✓	✓	2005-2012	Book chapter	N/A
Anaya-Arenas et al. (2014)	Relief management	Operational	General models	-	✓	✓	-	1990-2013	ANOR	83
Leiras et al. (2014)	Humanitarian logistics	Strategic, tactical	General models	✓	✓	✓	✓	1980-2012	JHLSCM	228
Hoyos et al. (2015)	Disaster operations management	Operational	Uncertainty models	✓	✓	✓	✓	2006-2012	C&IE	101
Özdamar and Ertem (2015)	Humanitarian logistics	Operational	General models & enabling technologies	-	-	✓	✓	1998-2014	EJOR	N/A
Zheng et al. (2015)	Disaster relief operations	Strategic, tactical	Evolutionary Optimization models	✓	✓	✓	✓	2004-2014	ASC	69
Balcik et al. (2016)	Relief management	Operational	Inventory models	-	✓	✓	-	2008-2015	SORMS	43
Gupta et al. (2016)	Disaster management	Strategic, tactical	General models	✓	✓	✓	✓	1957-2014	POM	28
Gutjahr and Nolz (2016)	Humanitarian aid	Strategic, tactical	Multi-criteria optimization	✓	✓	✓	✓	2007-2015	EJOR	N/A
Habib et al. (2016)	Humanitarian SCM	Operational	General models	-	-	-	✓	2005-2015	MPE	94
Bayram (2016)	Network evacuation management	Operational	Optimization models	-	-	✓	-	N/A	SORMS	191
Çelik (2016)	Humanitarian operations	Strategic, tactical	General models	-	-	-	✓	2000-2016	SORMS	100
Boonmee et al. (2017)	Humanitarian logistics	Operational	Facility location models	-	✓	✓	-	1950-2016	IJDRR	N/A
Zhou et al. (2018)	Natural Disaster management	Strategic, tactical	General models	✓	✓	✓	✓	2000-2016	IJDRR	100
Amideo et al. (2019)	Disaster management	Operational	Vehicle routing & facility location	-	-	✓	-	1980-2016	EJOR	N/A
Behl and Dutta (2019)	Humanitarian SCM	Strategic, tactical	General models	✓	✓	✓	✓	2011-2017	ANOR	362
Kovacs and Moshtari (2019)	Humanitarian operations	Operational	General models	✓	✓	✓	✓	2006-2018	EJOR	43
Farahani et al. (2020)	Casualty management	Operational	General models	-	-	✓	-	1977-2019	EJOR	88
Sabbaghtorkan et al. (2020)	Humanitarian logistics	Operational	General models	-	✓	-	-	2000-2018	EJOR	74
This paper	Natural disaster operations management	Strategic, tactical, operational	Optimization models	-	-	✓	-	2013-2022		127

*European Journal of Operational Research (EJOR), Annals of Operations Research (ANOR), International Journal of Disaster Risk Reduction (IJDRR), Production and Operations Management (POM), Mathematical Problems in Engineering (MPE), Surveys in Operations Research and Management Science (SORMS), Socio-Economic Planning Sciences (SEPS), Computers and Industrial Engineering (C&IE), Journal of Humanitarian Logistics & Supply Chain Management (JHLSCM), Applied Soft Computing (ASC)

2. Statistics about the characteristics of the articles

Figure 1 shows that the journals Transportation Research Part E: Logistics and Transportation Review (TRE) and ANOR dominated with respect to the number of recent OR publications regarding natural disaster relief operations. ANOR accounts for a significant portion of the recent publications in this domain due to the two special issues on the application of OR to Disaster Relief Operations (DRO) published in the journal in 2017 and 2018. Figure 2 displays the breakdown of the 127 articles by year and type of natural disaster. Between 2013 and 2022, approximately 58% of the studies concentrated on earthquakes while 14%, 18%, and 10% were devoted to hurricanes, floods, and other natural disasters, respectively. The category “Other” in this figure denotes natural disasters with a limited number of publications such as wildfires, typhoons, storms, landslides and tsunamis. Between 2013 and 2015, an average of six articles were published each year. For 2016 and 2017, the number of papers published rose to 13. Between 2018 and 2020, the number of published papers ranged from 19 to 24 per year, and finally, in 2021 and 2022, the number of published articles are 13 and 9, respectively. Overall, we see a clear upward trend in the number of optimization papers in DOM in recent years. While more than 50% of the studies are devoted to earthquakes, the numbers also suggest an increasing interest in extreme weather-related disasters such as hurricanes and cyclones. Interestingly, the proportion of research devoted to each type of natural disaster is not all that linked to the trends of natural disasters occurring worldwide, which are displayed in Figure 3.

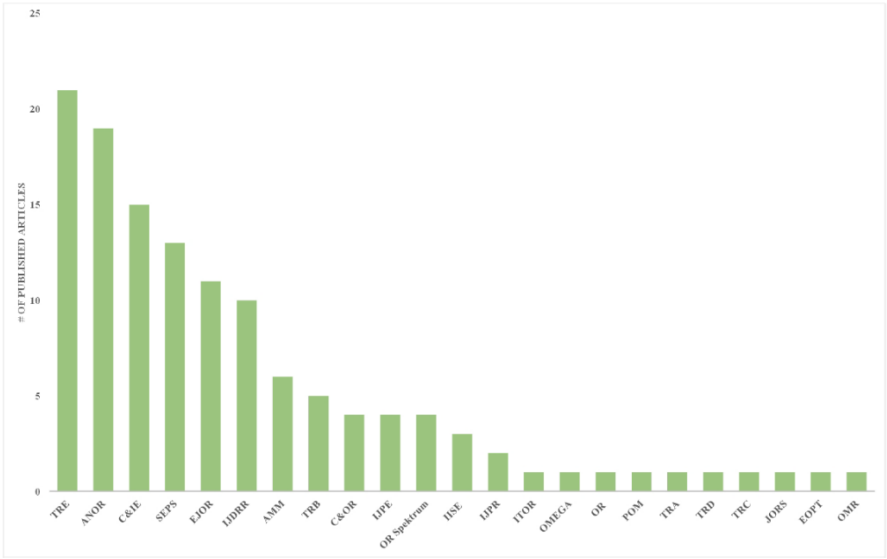

Figure 1: Number of articles in the selection published in different Q1 and Q2 OR&MS journals between 2013 and 2022.

Abbreviations: Transportation Research Part E: Logistics and Transportation Review (TRE), Computers and Industrial Engineering (C&IE), Socio-Economic, Planning Sciences (SEPS), Annals of Operations Research (ANOR), European Journal of Operational Research (EJOR), International Journal of Disaster, Risk Reduction (IJDRR), Applied Mathematical Modeling (AMM), Transportation Research Part B: Methodological (TRB), Computers and Operations, Research (C&OR), International Journal of Production Economics (IJPE), International Journal of Production Research (IJPR), International Transactions in Operational Research (ITOR), Operations Research (OR), Production and Operations Management (POM), Transportation Research Part A: Policy and Practice (TRA), Transportation Research Part D: Transport and Environment (TRD), Transportation Research Part C: Emerging Technologies (TRC), Operations Management Research (OMR), IISE Transactions (IISE), Journal of Operations Research Society (JORS).

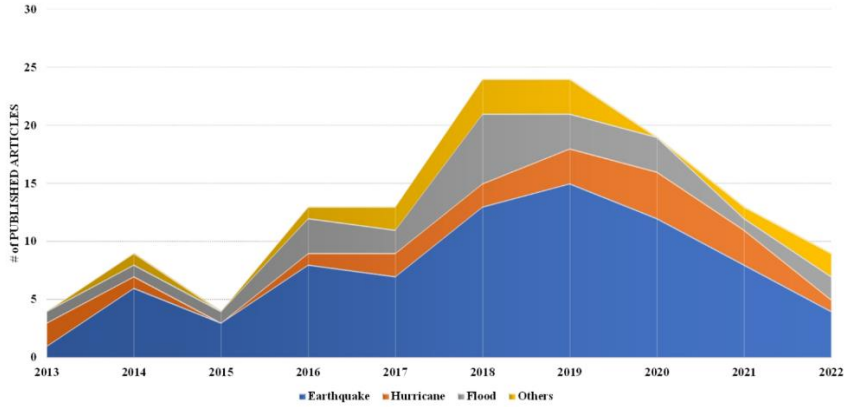

Figure 2: Trend in the number of papers published in OR&MS journals between 2013 and 2022 by disaster type.

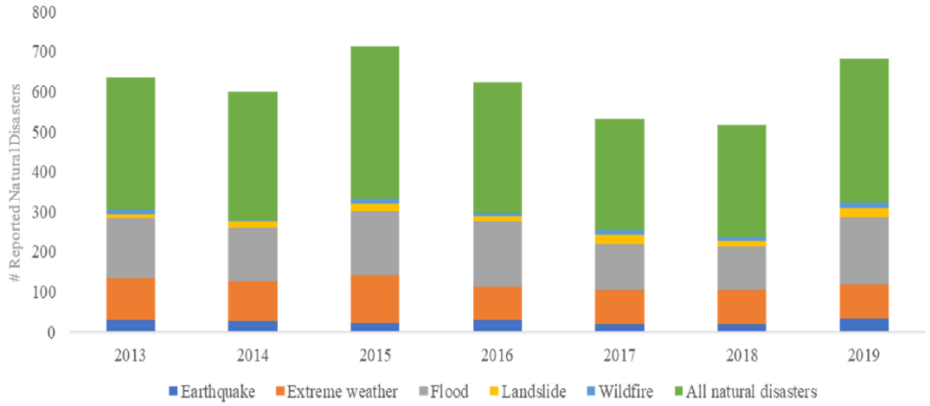

Figure 3: Number of globally reported natural disasters from 2013 to 2019 by type and year. Source: CRED (2020).

3. Grouping articles by various factors (Tables S1 to S9)

The term "relief commodity" in the definition of categories RD and FSL&RD refers to commodities such as food, water, blood products, medicine, hygiene kits, blankets, and medical supplies, excluding personnel and equipment. For each category mentioned above, we analysed the papers with regard to decision variables, constraints, objectives, solution methods, uncertainty modelling, sources of uncertainty, geographical location, and relief items considered. All relevant information related to the optimization models proposed in the papers is summarized in Tables S1 to S9 in the online supplement. In Tables S1, S2, and S3, the main decision variables and constraints of each model are provided, where papers are classified by natural disaster and relief operation category. Standard constraints related to most models such as flow conservation constraints for transportation problems and non-negativity constraints are excluded. Similarly, in Tables S4 to S6, the objective function and associated solution approach for each paper are presented under the same classification. Tables S7 and S8 characterize the papers, grouped by type of natural disaster, based on the source of uncertainty and the approach to modelling uncertainty. Finally, Table S9 provides additional information regarding relief resources and geographical location. Relief resources are classified into five main groups (food and water; medicine, medical kits, medical supplies, and hygiene kits; blood products; equipment, tents, and blankets; and general relief items). Excluded are vehicles and human resources since these are common to most location, transportation, and relief distribution problems. The term "facility" used in the tables applies to all types of facilities, including shelters, production centres, donor collection centres, hospitals, temporary medical units, and warehouses. In addition, the term "relief item" refers to all types of relief resources, including perishable items like food, water, blood products, and medicine, and imperishable commodities such as beds and other types of equipment.

Table S1 Group "RD" papers: Decision variables and constraints for all types of natural disasters

Author	ND*	Decision variables**	Constraints***
Akbarpour et al.	E	RD, IVRT, SHRT at hospitals, Agreement with supplier, supplier contract	NOF, commodity expiry, min RD, min IVRT target, RD to facilities, DSC, Supplier contract, supplier's lead-time
Baskaya et al.	E	FL, RD, LRT, IVRT	LRT, TD, FC, RD
Bozorgi-Amiri et al.	E	RP and RD from distribution centres, IVRT, FL	FL, RS, RD, NOF
Cheraghi	E	RC, RD, IVRT, SHRT, facility functionality, PT	NOF, FC, IVRT, DSC, patient treatment priority
Gao	E	RS and RD, NOV	RD, RS, NOV, VC, NOV
Gao and Cao	E	RS and RD, NOV	RS, FC, DSC, IVRT, VC, ROC
Hosseini-Motlagh et al.	E	RD, SHRT, blood expiry, and usage possibility	RD, DSC, FL, min and max IVRT, min DSC, IVRT policy, blood usage possibility by patients, NOF
Huang & Rezvan	E	ROC, relief items delivery, route selection	number of roads, RD, TW of RD, FC, VC
Huang et al.	E	RD	route accessibility, VC, max RD
Kamyabniya et al.	E	RD, IVRT, blood wastage, SHRT, VU	IVRT policy, min RD target, FC, NOF, DSC, the max daily VU, RD target, max production, number of blood donors
Khalilpourazari & Khamseh	E	FL, RD, IVRT, SHRT, VU	IVRT, temporary shelters movement, DSC, RD, max RS, FC, NOV

Liberatore et al.	E	RD	RD, RS threshold
Lu et al.	E	RD	RS, FC, IVRT
Ni et al.	E	FO, RP, SHRT, unused IVRT,	IVRT, FC, RD threshold
Ransikarbum & Mason	E	RD, disrupted roads and facilities, setup cost for network restoration, SHRT	transportation budget, restoration funds, facility availability, FC, ROC, road utilization, NOF that can be restored
Sakiani et al.	E	arrival time of vehicles, RD, VU	Max SHRT, VU, NOV, VU
Sheu	E	RD, amount of relief services required	RD, relief item availability, FC
Torabi et al.	E	FS and FO, RD, IVRT unused, SHRT	FC, multiple procurement policies, min RS of each supplier, DSC, procurement budget
Zhang et al. (2019a)	E	RD, IVRT	RS, RD, min security rate to ensure fairness, VC
Zhang et al. (2019b)	E	RD	min reliability of relief network, RS
Zhou et al.	E	RD, IVRT, SHRT	RS level
Abazari et al.	F	FL, RD, IVRT	Max TD, Max RD, NOF, TT, TW for RD, VC limit
Alem et al.	F	NOV contracted and used for RD, IVRT, RD, unused BD	RS, NOV, RS, BD
Doan and Shaw	F	RD	TT, number of relief teams, FC, relief items' requirement, BD
Garrido et al.	F	RD to demand points, VU, IVRT	DSC, NOV, IVRT, FL
Hu et al. (2017)	F	Selection of suppliers, FS, FC, IVRT, and RD	Max IVRT, Max surplus of relief items, number of suppliers serving relief facilities
Hu et al. (2019)	F	FS, NOV, expansion FC, SHRT	NOF, NOV, RD, VC of relief items
Rivera-Royero et al. (2016)	F	VU, BD remaining, RD	initial BD, VC, VU, FC
Rivera-Royero et al. (2020)	F	VU, BD remaining, RD, number of relief teams hiring	initial BD, VC, VU, FC
Rodriguez-Espindola et al. (2018b)	F	relief staff target, SHRT, FO, personnel allocation to hospitals, RD, VU, facility functionality	max RP, RD, number of personnel, FO, NOV, VU
Davis et al.	H	RS, RD, SHRT	IVRT, FC, TW of disaster regions, min DSC
Escudero et al.	H	RS, RD, FC, ROC, the fraction of usable commodities	type of investment, FC, relief item protection at facilities, IVRT
Grass et al.	H	RP, FL, SHRT and unusable, RD	NOF, ROC, RD under road destruction
Kelle et al.	H	RS at suppliers, PT, RD, SHRT, surplus	FC of State level and Federal level storage centers, max capacity of cities for evacuees, FC
Mondal et al.	H	RA	RA threshold,
Nagurney et al.	H	RD	FC, min-max demand for relief items
Velasquez et al.	H	RP, FO, relief procurement, RD	RS limit, ROC, IVRT
Shahparvari et al. (2016)	W	VU start time, total vehicle onboarding load	VU, TW for RD

*ND: natural disaster; E: Earthquake; F: Flood; H: Hurricane; W: Wildfire, ** Decision (RD: relief distribution; RS: relief supply; IVRT: inventory level of relief items; SHRT: shortage level of relief items; FL: facility location; LRT: lateral relief transshipment; RP: relief prepositioning; PT: patient transportation; RA: relief items allocation; FO: facility opening; FO: facility opening; VU: vehicle utilization; BD: relief budget; NOV: number of vehicles), ***Constraints (TW: time window; ROC: road capacity; FC: facility capacity; VC: vehicle capacity; TT: transportation time; NOF: number of facilities; TD: travel distance; NOV: Number of vehicles; DSC: demand satisfaction coverage)

Table S2 Group "FSL& RD" papers: Decision variables and constraints for all types of natural disasters

Author	ND*	Decision variable**	Constraints***
Ahmadi et al.	E	FL, VU, RD, unused relief items	DSC, VU, vehicle return to same-depot
Baharmand et al.	E	FL, RD, IVRT, route accessibility,	Max coverage time, DSC, RD, FC, NOF, VC, ROC
Cavdur et al.	E	FO, RD, SHRT	relief supply, facility capacity, number of facilities, facility safety level

Fazli-Khalaf et al.	E	RC, RD, FL, shelter movement, blood donor allocation to facilities	facility coverage, max RD, technology utilization, FC, NOV
Ghasemi et al.	E	FL, RD, PT to shelters, VU, unused relief items, SHRT	Min and Max FC, NOF, RS, VC of relief items and injuries
Samani et al.	E	FL, blood donation, production, and transportation, SHRT, wastage, IVRT	FL, NOF, max DSC, FC, max RC, relief item expiry, production capacity, min IVRT
Habibi-Kouchaksaraei et al.	E	RC, RD, IVRT, SHRT, FL	FC, FC for patients, DSC
Haeri et al.	E	FL, RD, IVRT, unserved injuries, demand dissatisfaction	Max RS, RD possibility, FC, min DSC, min number of evacuees should be assigned to shelters, the max IVRT, RD
Hassani & Mokhtari	E	Accessibility of vulnerable locations, FC expansion, SHRT, IVRT, RD, FL, FO	RD, BD, TW for FO, FC expansion
Jabbarzadeh et al.	E	FL, FO, RC, SHRT, IVRT	RS, temporary shelters relocation, DSC, blood donation level, FC
Khalilpourazari et al.	E	FL, RC, IVRT, SHRT, RD, VU, PT	DSC, FC, max NOV, VC, IVRT
Maharjan and Hanaoka	E	RD, FO, facility allocation	service coverage of relief distribution centers, NOF, the target level of opening facilities
Mahootchi & Golmohammadi	E	RP, facility operationality, RD, IVRT, SHRT	RS target for delivery, non-limit LRT, ROC, max IVRT, FC, route accessibility
Mohammadi	E	RD, IVRT, SHRT, FL	DSC, FC, IVRT, BD, DSC, RD
Mohammadi & Yaghoubi	E	FL, patient assignment to hospitals, RD	Min DSC, shelters service coverage to injuries, TW for transportation, level of backup usage
Noyan & Kahvecioglu	E	FL, RD	NOF, FC, RS, equity-based allocation policy, BD
Paul and MacDonald	E	RS at distribution centers, FL	BD, RD, FC, NOF
Rahmani et al.	E	FL, IVRT, RD	DSC, facility disruption possibility, FC, primary and backup suppliers, BD
Rennemo et al.	E	FO, VU, RD	RD, IVRT, max NOV, ROC, DSC, VC, BD
Rezaei-Malek et al.	E	RD, SHRT, FO, remaining relief item usable, IVRT	IVRT, the lifetime of relief items, SHRT, RD through available routes, BD, the equity level
Sanci & Daskin	E	FL, RD, number of equipment used for the restoration of routes, relief equipment usage	FL, FC, route availability, number of restoration equipment, repairing time of equipment, DSC, BD
Tofighi et al.	E	FO, RD, SHRT	max TT, demand equity
Wang et al. (2021)	E	RC, RD, IVRT, FS, a surplus of relief items, SHRT	RD, RS threshold, DSC, FC
Wang et al. (2014)	E	FO, VU, RD, SHRT	Vehicle start-return at the same depot, RD, RS level, VC
Yahyaei & Bozorgi-Amiri	E	FL, FO, RD	DSC, TD, FC, NOF, backup relief support
Zarrinpour et al.	E	FL, patient assignment to hospitals	min-max NOF, service quality of hospitals
Zokaee et al.	E	RD, FL, SHRT	RS level, min DSC rate, RD fairness, FC
Manopiniwes & Irohara	F	FO, RD, IVRT	FC, IVRT, DSC, RD, evacuee receiving service
Mollah et al.	F	FS, VU	number of evacuees, TW for RD
Moreno et al. 2016	F	VU, RD, IVRT, SHRT	Initial SHRT and IVRT, min and max NOV, route availability, ROC, facility functionality time target,
Moreno et al. 2018	F	VU, RD, IVRT, SHRT	RS, VC, NOV, availability of routes, max ROC
Rodriguez-Espindola et al. (2018a)	F	FO, SHRT, personnel allocation to hospitals, RD, VU	max prepositioning of relief items, RD, number of personnel, FO, NOV, VU
Safaei et al.	F	FL, RD, SHRT	FC, level of purchase of relief items, supplier capacity, IVRT
Li et al.	H	FO, RA	NOF, DSC
Paul & Zhang	H	RS at distribution centers, RD	BD, RD, FC
Wang et al. (2021)	H	FL, RP, RD, SHRT, surplus	TD, road utilization time limit, FC, NOF, LRT
Gu et al.	TS	FL, FC, RD, patient allocation to shelters.	FC for patients, RD, max BD, FL possibility
Sheu & Pan	TY	PT, injuries treatment, RD	ROC, FC, number of evacuees

*ND: natural disaster; E: Earthquake; F: Flood; H: Hurricane; W: Wildfire**,** ** Decision (RD: relief distribution; RS: relief supply; IVRT: inventory level of relief items; SHRT: shortage level of relief items; FL: facility location; LRT: lateral relief transshipment; RP: relief prepositioning; PT: patient transportation; RA: relief items allocation; FO: facility opening; FS: facility selection; VU: vehicle utilization; BD: relief budget; NOV: number of vehicles)**,** ***Constraints (TW: time window; ROC: road capacity; FC: facility capacity; VC: vehicle capacity; TT: transportation time; NOF: number of facilities; TD: travel distance; NOV: Number of vehicles; DSC: demand satisfaction coverage)

Table S3 Group "FSL" and "ET" papers: Decision variables and constraints for all types of natural disasters

Author	ND*	Problem	Decision variable**	Constraints***
Baharmand et al.	E	**FSL**	FO, RD, FL	Max coverage time, DSC, RD, FC, NOF, VC, ROC
Kilci et al.	E		FL, assigning an affected region to relief facilities	FC, NOF, TD, facility utilization threshold, DSC
Kinay et al.	E		FL, assigning an affected region to relief facilities	Shelter service coverage, FC, the min utilization rate of shelters
Wei et al.	F		FO, VU, vehicle service start time	IVRT, RD, VU, vehicle start-return at the same depot
Li et al. (2020)	F		FL, assigning an affected region to relief facilities	NOF, FC for injuries, shelter service coverage
Liu et al. (2018)	E	**ET**	PT, number of evacuees transferring to relief facilities, VU, SHRT	Max mobilization levels of relief personnel and critical population, NOV, number of relief personnel, max VU limit, FC
Shirinpour & Mahdavi-Amiri	E		FL, PT, VU	NOF, NOV, number of injuries, FC, shelter service level
Liu et al. (2019b)	E		RD, PT, unserved injuries, SHRT, VU	FC, VU possibility, VC
Liu (2020)	E		Serving injuries at relief facilities, FS	shelter service coverage, the time window for casualty treatment, NOF
Najafi et al. 2013	E		RD, PT, VU, SHRT	RD, number of injuries, transportation policy for injuries, and RD, FC
Najafi et al. 2014	E		RD, PT, VU, SHRT	RD, number of injuries, transportation policy for injuries, and RD, FC
Perez-Galarce et al. (2017)	E		PT, evacuee selection for delivery to facilities	PT rate, FC, NOF, shelter utilization level
Sabouhi et al.	E		VU, PT, RD, the arrival time of vehicle	vehicle start-return at the same depot, min level PT, VC, IVRT, FC, NOV, TW for RD, the arrival time of vehicles
Setiawan et al.	E		RD, FL, PT, VU	SHRT, VC, NOF, NOV, number of casualties, FC, vehicle availability
Li et al. (2020)	F		PT, RD	FC for relief items and injuries
Yi et al.	H		the evacuation order, VU	evacuation order
Mejia-Argueta et al.	F		VU, FO, RD	VC, ROC, min and max FC, facility service coverage, NOF, Min facility utilization threshold, BD
Zhu et al.	F		PT, VU, arrival time of patients to the medical center	VU, VC of injuries, vehicle arrival TW, max tolerable suffering duration
Shahparvari & Abbasi (2017)	W		VU, FS	FC, VC for injuries, TW for VU
Zhou and Erdogan (2019)	W		relief teams hiring, relief teams delivery, RD, the possibility of an area become an entirely burned or a high-risk region	BD, number of equipment, number of personnel, RS level, resource availability, RD

*ND: natural disaster; E: Earthquake; F: Flood; H: Hurricane; W: Wildfire, ** Decision (RD: relief distribution; RS: relief supply; IVRT: inventory level of relief items; SHRT: shortage level of relief items; FL: facility location; LRT: lateral relief transshipment; RP: relief prepositioning; PT: patient transportation; RA: relief items allocation; FO: facility opening; FS: facility selection; VU: vehicle utilization; BD: relief budget; NOV: number of vehicles), ***Constraints (TW: time window; ROC: road capacity; FC: facility capacity; VC: vehicle capacity; TT: transportation time; NOF: number of facilities; TD: travel distance; NOV: Number of vehicles; DSC: demand satisfaction coverage)

Table S4 Group "RD" papers: Objective functions and solution approaches for all types of natural disasters

Author	ND*	Objective function	Solution approach
Akbarpour et al.	E	min cost (setting up option contracts with suppliers, procurement, establishing warehouses, inventory holding, transportation, unmet demand), max-min amount of covered demand in each affected area	Exact
Baskaya et al.	E	min average travel distance per the relief item, including vulnerability effect.	Exact
Bozorgi-Amiri et al.	E	min total relief cost (facility setup, procurement, inventory holding, transportation, relief shortage), min shortage	Lp-metric
Cheraghi & Hosseini-Motlagh	E	min cost (facility establishment, transportation, inventory), min-max shortage	the fuzzy-VIKOR, interactive approach

Gao	E	Min dissatisfaction level for all commodities, min expected total transportation time	Exact
Gao and Cao	E	Min expected total unmet demand for relief items, and min expected total transportation time	Scenario-based approach, epsilon-constraint method
Hosseini-Motlagh et al. (2020)	E	Min expected total shortage of blood products, Min total cost (opening facilities, purchasing blood, delivery, and shortage)	Compromise programming
Huang & Rezvan	E	Max fulfillment equity, Min variance of deprivation time	A heuristic algorithm
Huang et al.	E	Maximize Equality, Min delay time, Min delay cost or consequence of delay for the injuries	Rolling horizon approach, variational inequality
Kamyabniya et al. (2018)	E	Min delivery time, Min total operational costs (blood production, inventory, and wastage, delivery)	A heuristic coordination approach
Khalilpourazari & Khamseh	E	Min cost (facility establishment, moving temporary blood facilities, storing, shortage), Min transportation time	Lp-metric, goal programming
Liberatore et al.	E	Maximize Demand Coverage	An iterative coordinated heuristic approach, lexicographic optimization
Lu et al.	E	Min Delivery time	Rolling Horizon
Ni et al.	E	Min relief costs	Benders decomposition
Ransikarbum & Mason	E	Min total cost (funds spent for route restoration, relief transportation), Min shortage, Max equality	Goal programming
Sakiani et al.	E	Min deprivation and operating costs	Specialized simulated annealing (SA)
Sheu	E	Min total cost, Max Lifesaving Utility	Exact
Torabi et al.	E	Min total cost (facility establishment cost, relief procurement, inventory, supplier agreement, relief distribution, shortage)	Differential evolution (DE) algorithm
Zhang et al. (2019a)	E	Min expected total transportation time, cost, shortage	fuzzy approach, approximation approach
Zhang et al. (2019b)	E	Min relief shortage, Min deviation supplies for the forecasted demand, Min number of prepositioned items	Exact
Zhou et al.	E	Min shortage of relief items, Min risk of the resource cannot be delivered to disaster areas	An evolutionary algorithm based on decomposition
Abazari et al.	F	min travel distance, min-cost (relief center establishing, relief items acquisition, vehicle purchasing, inventory holding), min-max travel time to demand points, min total quantity of perished items.	Lp-metric, Grasshopper optimization
Alem et al.	F	min cost (prepositioning stock, renting vehicles, inventory, and unmet demand)	A two-phase heuristic approach
Doan and Shaw	F	Min cumulative shortfall of relief resources, Min total number of relief equipment & specialists	Exact
Garrido et al.	F	Min cost (transporting relief products, vehicle movement among depots)	A heuristic sample average approximation method
Hu et al.	F	Min expected cost (inventory, procurement of relief items, and shortage)	Exact
Hu et al.	F	Min relief cost (vehicle rental, transportation, shortage, facility locating)	Progressive hedging algorithm (PHA)
Rivera-Royero et al. (2016)	F	Min total shortage of relief items	Exact
Rivera-Royero et al.(2020)	F	Min total shortage of relief items	Exact
Rodriguez-Espindola et al. (2018a,b)	F	Min cost (location of facilities, personnel, procurement, transportation), Min-Max shortage	Weighted sum method, Epsilon-constraint
Davis et al.	H	min expected cost (relief prepositioning, relief distribution and redistribution, shortage)	Exact
Escudero et al.	H	Min expected cost (facility selection investment, commodity transportation, shortage)	A decomposition algorithm
Grass et al.	H	Min cost (opening facilities, prepositioning, transportation, and unsatisfied demand)	L-Shaped, Interior Point Method
Kelle et al.	H	Min expected cost (relief transportation, surplus and shortage), Min-Max regret	L-Shaped
Mondal et al.	H	Min resource shortage	Particle swarm optimization (PSO) approach
Nagurney et al. (2016)	H	Max financial fund gain through coordination among relief entities through Generalized Nash Equilibrium	Variational inequality
Velasquez et al. (2020)	H	Min total cost (warehouse setup, relief prepositioning, surplus, shortage)	Column-and-constraint generation algorithm
Shahparvari et al. (2017)	W	Min operational cost	Interactive fuzzy programming

*ND: natural disaster; E: Earthquake; F: Flood; H: Hurricane; W: Wildfire

Table S5 Group "FSL& RD" papers: Objective functions and solution approaches for all types of natural disasters

Author	ND*	Objective function	Solution approach
Ahmadi et al.	E	min total distribution time, penalty cost of unsatisfied demand, fixed cost of opening local depots.	Meta-heuristics variable neighborhood search (VNS) algorithm
Baharmand et al.	E	min cost (transportation, relief personnel), min time (setup, operation)	Augmented epsilon-constraint
Cavdur et al. (2016)	E	min total travel distance, the total number of facilities, shortage	Exact
Fazli-Khalaf et al.	E	Min total cost (facility establishment, relief item collection, transportation, holding), min transportation time, max reliability of blood products' testing	Exact
Ghasemi et al.	E	Min Unserved Injuries, Min cumulative shortfall of relief resources, Min cost (relief centers and shelters establishment, provision and transportation of commodities)	A heuristic Epsilon-constraint and NSGA-II approach
Samani et al. (2016)	E	Min cost (facility establishment, transportation, operating, human resource, inventory), min-max shortage, min time-span	Interactive fuzzy
Habibi-Kouchaksaraei et al.	E	Min cost (opening shelters and facilities, transporting blood units, testing and processing of blood products, holding and distribution), min-max shortage	Exact, goal programming
Haeri et al.	E	Min shortage of relief items, Min cost (facility locating, operating, transporting, and holding of relief items), min expected value of transportation of relief costs	Fuzzy-goal programming approach
Hassani & Mokhtari	E	Min relief cost, Min-max regret in the total cost	Rolling horizon approach, Exact
Jabbarzadeh et al.	E	Min expected cost (facility locating, moving shelters to other locations, operating, transportation, inventory, and shortage)	Exact
Khalilpourazari et al.	E	Min cost (facility establishment, moving temporary blood facilities, storing, shortage), Min transportation time, Min-Max of shortage	Lexicographic weighted Tchebycheff method
Maharjan and Hanaoka	E	Min total cost (operating cost of open facilities, transportation)	Exact
Mahootchi & Golmohammadi	E	Min total cost (transportation, resource holding, shortage, and surplus cost)	Exact
Mohammadi et al. (2016)	E	Max total expected demand coverage, Min total relief costs, Min-Max dissatisfaction rate	Particle swarm optimization (PSO) approach
Mohammadi & Yaghoubi	E	Min travel time, Min total relief costs	Epsilon constraint
Noyan & Kahvesioglu	E	Max accessibility to central depots and distribution centers	Scenario decomposition-based branch-and-cut algorithm
Paul and MacDonald	E	Min total expected cost (fatality, supply, facility establishment)	An iterative heuristic
Rahmani et al.	E	Min total cost (transportation, disrupted facilities, and unreliable centers not disrupted)	Lagrangian relaxation and an iterative heuristic algorithm
Rennemo et al.	E	Max Lifesaving Utility	Exact
Rezaei-Malek et al.	E	Min Response Time, Min total cost	An interactive approach (The reservation level Tchebycheff procedure)
Sanci & Daskin	E	Min total cost (facility establishment, restoration equipment)	A heuristic approach, Sample average approximation
Tofighi et al.	E	Min Delivery time, Min total cost (operational, facility location, inventory)	Differential evolution (DE) algorithm
Wang et al. (2020)	E	Min total cost (inventory, transportation)	KKT condition, interior point algorithm
Wang et al. (2014)	E	Min-max (travel time), Min total cost (facility establishment, transportation), Max-Min route reliability for all the serving vehicles	non-dominated sorting genetic algorithm (NSGA-II), non-dominated sorting differential evolution algorithm (NSDE)
Yahyaei & Bozorgi-Amiri	E	Min total evacuation cost (transportation of relief items and evacuees, facility opening)	Exact
Zarrinpour et al.	E	Min cost (facility location, patient transportation)	Benders decomposition algorithm
Zokaee et al.	E	Min cost (location of facilities, relief delivery, shortage)	Exact
Manopiniwes & Irohara	F	Min expected costs	Weighted sum method
Mollah et al.	F	Min cost (transportation of relief resources and injuries, a penalty of the un-evacuated population)	Genetic algorithm (GA)
Moreno et al. (2016)	F	Min total expected cost (opening and operating relief centers, vehicle assignment, transportation, shortage)	An iterative heuristic

Moreno et al. (2018)	F	Min total cost, Min human-suffering	An iterative heuristic
Rodriguez-Espindola et al. (2018a,b)	F	Min cost (location of facilities, personnel, procurement, transportation), Min-Max shortage	Weighted sum method, Epsilon-constraint
Safaei et al.	F	Min total cost, Min total supply risk for all suppliers	A Technique for Order Preference by Similarity to an Ideal Solution (TOPSIS)
Li et al. (2018)	H	Min travel distance, Min-max regret	Exact
Paul & Zhang	H	Min expected cost (medical supplies, facilities setup, transportation, fatality, deprivation)	Exact
Wang et al. (2021)	H	Min expected cost (facility location, commodity procurement, the shipment of relief items, shortage and holding)	Exact
Gu et al.	TS	Max Demand Coverage	Heuristic Greedy Approach
Sheu & Pan	TY	Min distance, Min total cost (operational, psychological)	Exact

*ND: natural disaster; E: Earthquake; F: Flood; H: Hurricane; W: Wildfire; TS: Tsunami; TY: Typhoon

Table S6 Group "FSL" and "ET" papers: Objective functions and solution approaches for all types of natural disasters

Author	ND*	Relief problem	Objective function	Solution approach
Baharmand et al.	E	FSL	min cost (transportation, relief personnel), min time (setup, operation)	A heuristic approach
Kilci et al.	E		Max demand coverage	Exact
Kinay et al.	E		Max demand coverage	Goal Programming, Epsilon-constraint
Wei et al.	F		Min time window for relief delivery, min total operational cost (facility opening, vehicle utilization, and transportation)	A hybrid ant colony optimization (ACO) algorithm
Li et al. (2017)	H		Min total construction cost of shelters	Cross-entropy method
Liu (2020)	E		Min total distance to facility centers, Min number of opened relief facilities	Genetic algorithm (GA), Technique for Order Preference by Similarity to an Ideal Solution (TOPSIS)
Liu et al. (2018)	E	ET	Min cost (shortage, delivery of relief items, recruiting vehicles, transportation cost)	Exact
Shirinpour & Mahdavi-Amiri	E		Min relief time (establishment of facilities, transportation)	Genetic Algorithm (GA)
Najafi et al. (2013)	E		Min Unserved Injuries, Min total number of relief equipment, vehicles, shelters, and specialists, Min relief shortage	An iterative heuristic
Najafi et al. (2014)	E		Min Unserved Injuries and Min shortage of relief items	Rolling horizon, Exact
Perez-Galarce (2017)	E		Min total travel distance	Exact
Sabouhi et al.	E		Min total arrival times of vehicles at affected areas, shelters, and distribution centers	A Memetic algorithm
Setiawan et al.	E		Min unmet demand, Min-Max injuries suffering	A heuristic approach
Zhu et al.	F		Min total cost (transportation, absolute deprivation, relative deprivation)	Ant colony optimization (ACO) algorithm
Mejia-Argueta et al.	F		Min-Max evacuation time, Min-Max relief distribution time, Min total cost (facility location, relief prepositioning and distribution, evacuation)	Epsilon Constraint, Weighted sum approach
Yi et al.	H		Min total travel relief time, travel and sheltering at home risk	The augmented Lagrangian algorithm, progressive hedging algorithm (PHA)
Li et al. (2020)	H		Min expected cost (facility opening, prepositioning relief items, resource allocation, evacuation, unevacuated penalty)	Progressive hedging algorithm (PHA)-augmented Lagrangian relaxation
Shahparvari & Abbasi (2017)	W		Max total number of evacuees	Heuristic Greedy Approach
Zhou & Erdogan (2019)	W		Min total expected evacuees, Min total expected cost (relief teams hiring, resource allocation, property losses)	Goal programming

*ND: natural disaster; E: Earthquake; F: Flood; H: Hurricane; W: Wildfire

Table S7 Group papers: Uncertainty modeling for Earthquake type of natural disaster

Author	Uncertainty modeling*	Source of Uncertainty
Acar & Kaya	Two-stage ST	Service rate for hospital, demand rate, hospital damage rate
Ahmadi et al.	Two-stage ST	Travel times, accessibility between each location.
Akbarpour et al.	Two-stage ST, min-max RO	the demand for relief items
Bozorgi-Amiri et al.	RO, ST	transportation cost, the fraction of usable demand and supply, demand and supply of relief items
Cavdur et al. (2016)	Two-stage ST	the demand for relief items
Cheraghi & Hosseini-Motlagh (2020)	RO, FZP	supply and demand of relief items, accessibility rate of relief centers, the distance among relief centers, and demand points
Fazli-Khalaf et al.	RO, CCP, FZP	relief costs, transportation time, facility capacity, the demand for relief item
Gao	EVST	demand for relief items, availability of roads
Gao and Cao	EVST	demand for relief items, traffic flow
Ghasemi et al.	ST-CCP	demand for relief items, the number of injuries, the capacity of facilities, relief costs, remaining usable items, the functionality of vehicles
Samani et al. (2018)	Two-stage ST, FZP	Relief costs, transportation time, facility capacity, the demand for relief item, travel distance, maximum servicing coverage
Habibi-Kouchaksaraei et al.	Scenario-based RO	relief cost, facility capacity, the demand for injuries for treatment, useful rate of relief items
Haeri et al.	FZP, CCP	demand for relief items, the number of injuries
Hassani & Mokhtari	Scenario-based RO	demand for relief items, the capacity of relief centers, operationality of centers, accessibility rate for receiving relief at the affected location
Hosseini-Motlagh et al. (2020)	RO, FZP, ST	demand for blood, shortage, inventory, and purchase costs of blood products, facility opening cost, the supply of blood, rate of disruption
Jabbarzadeh et al.	RO, two-stage ST	Relief cost, blood demand, and supply, the capacity of facilities and shelters
Kamyabniya et al.	RO, FZP	Demand and donation of blood products
Kinay et al.	ST-CCP	Demand for relief items
Liu et al. (2018)	RO, ST	Demand for relief, affected population, flight time
Liu et al. (2019b)	Robust model predictive control	Demand and supply of relief commodities, number of injuries, the capacity of facilities for injuries
Maharjan and Hanaoka	FZP-CCP	demand and supply of relief items, relief costs
Mahootchi & Golmohammadi (2018)	Two-stage ST	transportation capacity, route capacity, relief demand, relief costs
Mohammadi et al. (2016)	EVST	demand for relief items, relief costs
Mohammadi & Yaghoubi	ST	Travel time, relief costs, number of injuries, relief demand, treatment time,
Mohammadi et al. (2020)	RO, FZP	the demand for relief items, relief costs, transportation time, and capacity of facilities
Najafi et al. (2013)	RO	demand and supply of relief items, number of injuries
Ni et al.	Min-Max RO, two-stage ST	relief costs, demand for relief items, and capacity of facilities for relief items
Noyan & Kahvesioglu	Two-stage ST, Mean-risk, CVAR	relief costs, demand for relief items, and demand coverage of facilities for relief items
Ozbay et al.	Three-stage ST, CVAR	number of affected populations
Paul and MacDonald	EVST	number of injuries, relief costs, commodities usable, travel time
Rahmani et al.	Scenario-based RO	relief demand, disruption of facilities
Rennemo et al.	Three-stage ST	The capacity of routes, demand for relief items, travel time, transportation cost
Rezaei-Malek et al.	Scenario-based RO, ST	Travel time, shortage cost, relief demand, shortage tolerance at facilities, the proportion of prepositioned commodity

Sanci & Daskin	Two-stage ST	demand for relief items, repair time of route
Sheu	ST	Demand and supply of relief items
Tofighi et al.	FZP, ST	relief costs, transportation time, demand for relief items, usable inventory, the capacity of facilities
Torabi et al.	Scenario-based FZP, two-stage ST	relief costs, demand, and wastage of relief items, available procurement budget
Wang & Chen (2020)	RO, ST	blood demand
Yahyaei & Bozorgi-Amiri	RO	risk of facility disruption
Zarrinpour et al.	RO, two-stage ST	demand rate of relief items, service rate at hospitals, patients' waiting time, relief costs
Zhang et al. (2019a)	Three-stage ST	transportation time, relief demand, relief costs
Zokaee et al.	Scenario-based RO, ST	Demand and supply of relief items, shortage cost

*RO: robust optimization; ST: stochastic optimization; FZP: fuzzy programming; EVST: expected value ST; CCP: chance-constraint programming; CVAR: conditional value at risk

Table S8 Group papers: Uncertainty modeling for flood, hurricane, and other types of natural disaster

Author	ND	Uncertainty modeling	Source of Uncertainty
Abazari et al.	F	EVST	Vehicle loading and unloading time, acquiring cost of relief items, establishing relief centers' cost, and demand of relief items.
Alem et al.	F	Two-stage ST, CVAR	supply and demand for emergency aid, availability of budget, accessibility of roads, the fraction of usable relief items
An et al.	H	EVST	travel cost under facility disruption scenarios, number of rescuees, service rate, waiting time.
Davis et al.	H	Two-stage ST	supply and demand for relief items, road congestion factor
Doan and Shaw	F	Two-stage ST	response time, location of the disaster
Escudero et al.	H	Three-stage ST	Capacity of facilities
Garrido et al.	F	EVST	demand for relief items
Grass et al.	H	Two-stage ST	The proportion of usable items, road capacity, relief demand
Hu et al. (2017)	F	Two-stage ST, CVAR	demand for relief items
Hu et al. (2019)	F	Three-stage ST	Road capability, vehicle renting cost
Kelle et al.	H	RO, two-stage ST	Total evacuees, relief costs
Li et al. (2017)	H	Two-stage ST	demand for relief items
Li et al. (2020)	H	Scenario-based RO, ST	number of evacuees, transportation time
Manopiniwes & Irohara	F	Two-stage ST	the demand for relief items, relief costs
Moreno et al. (2016)	F	Two-stage ST	Relief demand and supply, the proportion of commodity usable, road availability
Moreno et al. (2018)	F	Two-stage ST	Relief demand and supply, the proportion of commodity usable, road availability
Paul & Zhang	H	Two-stage ST	number of injuries, relief costs, commodities usable, travel time
Safaei et al.	F	RO	The demand for relief items
Shahparvari & Bodaghi (2018)	W	FZP	Time-window for evacuation for vehicles
Shahparvari & Abbasi (2017)	W	RO, ST	number of evacuees, evacuation time window, shelter capacity
Shahparvari et al. (2017)	W	FZP	number of evacuees, evacuation time window, travel time, route disruption risk
Velasquez et al.	H	RO, two-stage ST	The proportion of usable items, demand

Wang & Chen (2020)	H	Two-stage ST	demand for relief items, relief costs, remaining relief items usable
Yi et al.	H	Multi-stage ST	Evacuation travel demand
Zhou & Erdogan (2019)	W	Two-stage ST	fire suppression rate, evacuation percentage, population density

*RO: robust optimization; ST: stochastic optimization; FZP: fuzzy programming; EVST: expected value ST; CCP: chance-constraint programming; CVAR: conditional value at risk

Table S9 Group papers: Geographic locations and Relief items for all types of natural disasters

ND	Location	Relief items and country of case study
Earthquake	**Asia**	***Food & Water***
		Nepal: Baharmand et al. (2020), Baharmand et al. (2019)
		Iran: Bozorgi-Amiri et al. (2013), Mahootchi and Golmohammadi (2018), Mohammadi et al. (2016), Ghasemi et al. (2020), Sabouhi et al. (2019), Sakiani et al. (2020), Tofighi et al. (2016), Zokaee et al. (2016)
		Turkey: Cavdur et al. (2016)
		China: Gao (2019), Gao and Cao (2020), Liu et al. (2019), Lu et al. (2016), Ni et al. (2018), Wang et al. (2014), Zhang et al. (2019)
		Indonesia: Setiawan et al. (2019)
		Taiwan: Sheu (2014)
		Medicine & medical kits & medical supplies & hygiene kits
		Iran: Akbarpour et al. (2020), Haeri et al. (2020), Rahmani et al. (2018), Rezaei-Malek et al. (2016), Sabouhi et al. (2019), Tofighi et al. (2016)
		China: Huang et al. (2015), Liu (2020)
		Indonesia: Setiawan et al. (2019)
		Blood products
		Iran: Cheraghi and Hosseini-Motlagh (2018), Fazli-Khalaf et al. (2019), Samani et al. (2018), Habibi-Kouchaksaraei et al. (2018), Haeri et al. (2020), Hosseini-Motlagh et al. (2020), Jabbarzadeh et al. (2014), Kamyabniya et al. (2018, 2019), Khalilpourazari and Khamseh (2019), Khalilpourazari et al. (2020)
		China: Wang and Chen (2020)
		Relief items (equipment, tent, blanket)
		Iran: Bozorgi-Amiri (2013), Haeri et al. (2020), Mahootchi and Golmohammadi (2018), Sabouhi et al. (2019), Sakiani et al. (2020), Tofighi et al. (2016), Zokaee et al. (2016)
		China: Ni et al. (2018), Zhang et al. (2019),
		Taiwan: Sheu (2014)
		General (not specified explicitly)
		Iran: Torabi et al. (2018), Hasani and Mokhtari (2018), Mohammadi et al. (2020), Najafi et al. (2013), Najafi et al. (2014)
	North America	***Food & Water, Medicine & medical kits & medical supplies & hygiene kits***
		USA: Ahmadi et al. (2015)
		General (not specified explicitly)
		USA: Ransikarbum and Mason (2016)
	South America	***Food & Water, Relief items (equipment, tent, blanket)***
		Chile: Pérez-Galarce et al. (2017)
	Europe	***Relief items (equipment, tent, blanket)***

Flood		**Turkey:** Kılcı et al. (2015)
		General (not specified explicitly)
		Turkey: Salman and Gül (2014), Sanci and Daskin (2019)
		Food & Water, Medicine & medical kits & medical supplies & hygiene kits
		Nepal: Maharjan and Hanaoka (2020)
		Haiti: Rennemo et al. (2014)
	The Caribbean	***Relief items (equipment, tent, blanket)***
		Haiti: Rennemo et al. (2014)
		General (not specified explicitly)
		Haiti: Huang and Rafiei (2019), Liberatore et al. (2014)
		Food & Water
		Iran: Abazari et al. (2020), Safaei et al. (2018)
		China: Hu et al. (2017)
		Medicine & medical kits & medical supplies & hygiene kits
		India:Mollah et al. (2018)
	Asia	**Iran**: Abazari et al. (2020)
		Relief items (equipment, tent, blanket)
		Iran: Abazari et al. (2020)
		General (not specified explicitly)
		China: Manopiniwes and Irohara (2017)
		Iran: Abazari et al. (2020)
		Food & Water
	North America	**USA**: Hu et al. (2019)
		Food & Water, and Medicine & medical kits & medical supplies & hygiene kits
		Brazil: Alem et al. (2016), Moreno et al. (2016), Moreno et al. (2018)
		Chile: Garrido et al. (2015)
		Mexico: Rodríguez-Espíndola et al. (2018), Rodríguez-Espíndola et al. (2018), Mejia-Argueta et al. (2018)
	South America	**Colombia**: Rivera-Royero et al. (2016)
		Relief items (equipment, tent, blanket)
		Brazil: Alem et al. (2016)
		Chile: Garrido et al. (2015)
		General (not specified explicitly)
	Europe	**UK**: Doan and Shaw (2019)
Hurricane		***Food & water, medical items, relief items***
	Asia	**India**: Mondal et al. (2019)

Others		***Food & Water***
	North America	**USA**: Grass et al. (2020), Velasquez et al. (2020), Wang et al. (2020), Kelle et al. (2014), Nagurney et al. (2016), Escudero et al. (2018)
		Medicine & medical kits & medical supplies & hygiene kits, and Relief items (equipment, tent, blanket, cloth)
		USA: Kelle et al. (2014), Nagurney et al. (2016), Escudero et al. (2018), Grass et al. (2020), Velasquez et al. (2020), Wang et al. (2020),
		Food & Water, Medicine, equipment
	South America	**Brazil**: Li et al. (2020)
		Medicine & medical kits & medical supplies & hygiene kits
		Taiwan: Sheu and Pan (2014),
		South Korea: Gu et al. (2018)
	Asia	***Relief items (equipment, tent, blanket, cloth)***
		Taiwan: Zhou & Erdogan (2019)
		No Relief items
		Australia: Shahparvari et al. (2016), Shahparvari and Abbasi (2017), Shahparvari et al. (2017), Shahparvari and Bodaghi (2018), Shahparvari et al. (2019)